IN THE US PATENT & TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS & INTERFERENCES

APPLICANT: Hironori AOKI

SERIAL #: 10/ 049,792 ATT. DOCKET: 542-007.2

FILED: 14 FEB. 2002

TITLE: ARRAY SUBSTRATE DISPLAY DEVICE . . .

EXAMINER: Thoi DUONG ART UNIT: 2871

BRIEF ON APPEAL

15 FEB. 2005

Commissioner for Patents
PO BOX 1450
ALEXANDRIA VA 22313-1450

Sir:

Further to the Notice of Appeal mailed 15 NOV. 2004 and received 17 NOV. 2004, Applicant hereby submits this BRIEF ON APPEAL. An extension of time from 15 JAN. 2005 to 15 FEB. 2005 was previously obtained.

(1) REAL PARTY IN INTEREST

The real party in interest in this appeal is Advanced Display, Inc., the assignee by virtue of the assignment recorded 14 FEB. 2002 at Reel 12843, Frame 0962.

(2) RELATED APPEALS & INTERFERENCES

Counsel is not aware of any related appeals or interferences.

CERTIFICATE OF MAILING

The undersigned hereby certifies that this document is being deposited, pursuant to 37 C.F.R. 1.8, in the U.S. Mail, first-class postage prepaid, addressed to the Commissioner for Patents, PO BOX 1450, Alexandria VA 22313-1450 on FEB. 15, 2005.

Milton Oliver

Milton Oliver

(3) STATUS OF CLAIMS

Claims 1-3, 5-6, 8-13 and 15-18 are pending. All of the pending claims were finally rejected on JUNE 16, 2004.

(4) STATUS OF AMENDMENTS

No amendment was filed subsequent to the Final Rejection.

(5) SUMMARY OF THE CLAIMED SUBJECT-MATTER

The invention is directed to an array substrate, for use in a liquid crystal display (LCD), which, compared to the prior art, has decreased contact resistance. As discussed on page 4 of the specification, demand for liquid crystal displays with faster refresh rates and consistent luminance has promoted substitution of **aluminum** wiring layers for the previously-used **chrome** wiring layers. However, it has recently been recognized that a **tradeoff** is involved here, with wiring resistance **decreasing** but contact resistance **increasing** where contact holes 8 pass through insulating layers 3 to make connections with adjacent conductive layers, often to undesirable values. Such increases in contact resistance are partly caused by oxidation of the aluminum or aluminum alloy surface, but the present invention teaches that such oxidation can be reduced or eliminated by forming signal lines of a **high-melting-point metal** selected from the group consisting of chrome, molybdenum, tantalum and alloys thereof. This feature is recited in independent claim 1, lines 5-7, and independent claim 3, lines 7-9.

As discussed at specification page 37, lines 5-10, such limitation of the contact resistance facilitates production of liquid crystal displays which minimize signal delays caused by

contact resistance, and thereby provide a desirably even luminance across the LCD. At the time the present invention was made (Japanese priority date: JUNE 19, 2000), the **problem** of high contact resistance was not widely recognized, so how to **solve** the problem, in the context of an LCD array substrate, as recited in the present claims, was not known.

(6) GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

The first ground of rejection, applied to claims 1-3, 5-6, 8-12 and 15-18, was that DOHJO U.S.P. 6,078,366 (granted JUNE 20, 2000) allegedly anticipated all of the recited subject-matter under section 102(b).

The second ground of rejection, applied to dependent claim 13 (directed to nitridated aluminum layers), was that DOHJO USP 6,078,366, in combination with SAKATA (JP 11-284 195) suggested the claimed subject matter, because it would have been *obvious to modify* the circa-1995 DOHJO structure by introducing the nitridating feature of the circa-1999 SAKATA disclosure, in order to obtain a lower contact resistance.

(7) ARGUMENT

The claims form two groups, namely independent claim 3, and independent claim 1 and its dependent claims. Independent claim 3 essentially recites a combination of the features of claims 1 and 2.

THE SECTION 102(b) REJECTION

The present application is directed to an array substrate in which a problem of excessive "contact resistance" is avoided by forming certain electrodes of a **high**-melting-point metal, rather than **low**-melting-point metals as known in the prior art. The examiner has relied upon USP 6,078,366, col. 7, lines 35-37, which state: "While signal lines (110) are made of **Mo-W** alloy here, these may alternatively be constituted from **Mo-Ta** alloy, **Al or its alloy**." Since aluminum and its alloys are low-melting-point metals, teaching two alternatives, only one of which would be suitable for solving the "contact resistance" problem, does not constitute an "anticipation by inherency" which, as best understood, seems to be the contention of the examiner. The examiner's position seems to be that there is anticipation if either of the suggested alternatives would lower contact resistance, and that the reference need not mention "contact resistance."

ANTICIPATION BY INHERENCY REQUIRES **STRICT IDENTITY** OF ELEMENTS

There is a high standard for a finding of anticipation under section 102. Section 102 requires a finding that "each and every limitation is found either expressly or inherently in a single prior art reference," PIN/NIP, Inc. v. Platte Chemical Co., 64 USPQ2d 1344 (Fed. Cir. 2002); Verve, LLC v. Crane Cams, Inc., 65 USPQ2d 1051 (Fed. Cir. 2002); Chisum on Patents, §3.02[1][b]. Claims 1-3, 5-6, 8-12 and 15-18 recite varying combinations of structural elements, many of which cannot reasonably be "read on" the DOHJO elements cited the Action of 26 SEP. 2003. Aside from these other structural features, the present independent claims recite "a signal line formed of a high melting point metal selected from the group consisting of chrome, molydenum, tantalum and alloys thereof" and this limitation, among others, must be

met by the DOHJO reference in order to support a finding of anticipation under section 102.

AN ANTICIPATORY FEATURE MUST BE **NECESSARILY PRESENT**

The U.S. Supreme Court has held that accidental results, not intended and not appreciated, do not constitute anticipation; Eibel Process Co. v. Minnesota & Ontario Paper Co., 261 U.S. 45 (1923), cited in Chisum on Patents, §3.03[1][f]. The fact that DOHJO *accidentally* included some high-melting-point alloys among his suggested electrode materials does not amount to a teaching that such materials are **necessary**, or even **preferable** to DOHJO's other (low-melting-point aluminum) alternative.

Chisum §3.03[2][b] states "Federal Circuit decisions emphasize that an anticipatory inherent feature **must be consistent, necessary and inevitable**, not merely possible or probable," citing
In re Robertson, 49 USPQ2d 1949 (Fed. Cir. 1999);
Transclean Corp. v. Bridgewood Services, Inc., 62 USPQ2d 1865 (Fed. Cir. 2002); Trintec Indus., Inc. v. Topp-U.S.A. Corp., 63 USPQ2d 1597, 1599 (Fed. Cir. 2002) and Rosco, Inc. v. Mirror Lite Co., 64 USPQ2d 1676, 1680 (Fed. Cir. 2002). BPAI decisions make the same point. Relume Corp. v. Dialight Corp., 63 F. Supp.2d 788, 813 (E.D. Mich. 1999), affirmed 4 Fed. Appx. 893 (Fed. Cir. 2001) noted that "the fact, that **three** possible forms exist, precludes the argument that **any one** form is **necessarily present**." DOHJO teaches three forms: Mo-W alloy, Mo-Ta alloy or Al alloy, which **precludes** the argument that a high-melting-point form is **necessarily present**.

Although DOHJO col. 15, lines 35-39, discuss the fact that AL is a low-resistance material, and there are references at col. 10, line 51, col. 12, line 63, col. 12, lines 11 & 34, col. 15, line 25, and col. 16, last line, to using aluminum-yttrium alloy scanning lines, DOHJO **nowhere distinguishes** between **wiring** resistance and **contact** resistance, or suggests that doping the

aluminum alloy would solve any (apparently unrecognized) contact resistance problem. Rather, DOHJO's primary objectives are (col. 1, line 63) achieving high aperture ratio, (col. 2, line 7) avoiding interlayer short-circuiting, and (col. 9, lines 8-14) suppressing variations in scanning-line capacitance arising from mask placement deviations during manufacturing. DOHJO's main proposal to minimize resistance is to **use lots of contact holes**, spaced "preferably less than 20 micrometers, for example; more preferably, less than 15 micrometers" (col. 26, lines 39-40).

Forming the extended scanning line and extending auxiliary capacitance line only of the same conductive film as for the signal line (Cr or Mo or Ta), a lower total resistance along the scanning line is obtained without suffering from high contact resistance at the terminal ends of those lines. **DOHJO** uses low resistivity metal (Al) again in the terminal region (111a of scanning pad 152 in Fig. 1 and Fig. 7), resulting in **high contact resistance**.

By contrast, in accordance with the present invention, a same conducting film for signal line (Cr or Mo or Ta) used for the extending line and the extending auxiliary capacitance line, having a high melting point metal, is at the same time mechanically hard and corrosion-resistant. Mechanical hardness and corrosion resistance of those metals help to avoid breakage of those lines.

THE SECTION 103 REJECTION

Dependent claim 13 (which incorporates by reference the features of parent claim 1) was rejected as unpatentable over a combination of DOHJO (USP 6,078,366) with SAKATA (JP 11-284 195), the latter being cited for its teaching that nitridating aluminum, *in the context of the SAKATA structure* (having an interface between AL electrodes and a clear Indium Tin Oxide layer), leads to lower contact resistance. However, without the benefit of having read the present disclosure, there is nothing

to suggest attempting to combine these two disclosures. From the DOHJO side, DOHJO does not appreciate the nature of the contact resistance problem, and does not suggest combination with another disclosure to solve the (essentially metallurgical) problem. From the SAKATA side, there is nothing to suggest that any structural features are missing, or could be completed by adding the DOHJO structural features to SAKATA. Although there may be *incidental* similarities between the claimed invention and respective structural features of the two references, this does not provide sufficient motivation to combine those features in the manner suggested by the Examiner. "The mere fact that the prior art *could be* so modified would not have made the modification obvious, unless the prior art suggested the desirability of the modification." In re Gordon, 733 F.2d 900, 902; 221 USPQ 1125, 1127 (Fed. Cir. 1984). A "rote invocation" of the high level of skill in the art does not provide the necessary motivation to combine the teachings of the prior art to render a claimed invention obvious.
In re Rouffet, 47 USPQ2d 1453 (Fed. Cir. 1998).
In re McLaughlin, 170 USPQ 209 (CCPA 1971).
In re Wright, 193 USPQ 332 (CCPA 1977)
In re Geiger, 2 USPQ 2d 1276 (Fed. Cir. 1987).
In re Stencel, 4 USPQ 2d 1071 (Fed. Cir. 1987)
In re Fine, 5 USPQ 2d 1596 (Fed. Cir. 1988).
In re Jones, 21 USPQ 2d 1941 (Fed. Cir. 1992).
In re Van Geuns, 26 USPQ 2d 1057 (Fed. Cir. 1993).

"To imbue one of ordinary skill in the art with knowledge of the invention in suit, when no prior art reference or references of record convey or suggest that knowledge, is to fall victim to the insidious effect of a hindsight syndrome wherein that, which only the inventor taught, is used against its teacher." W.L. Gore, 721 F.2d at 1593, 220 USPQ at 312-313.

"A proper analysis under § 103 requires *inter alia*, consideration of two factors: (1) whether the prior art would have suggested to those of ordinary skill in the art that they

should make the claimed composition or device, or carry out the claimed process; and (2) whether the prior art would also have revealed that, in so making or carrying out, those of ordinary skill in the art would have a reasonable expectation of success. See In re Dow Chemical Co., 837 F.2d 469, 473; 5 USPQ 2d 1529 (Fed. Cir. 1988). Both the suggestion and the reasonable expectation of success must be founded in the prior art, not in the applicant's disclosure. In re Vaeck, 20 USPQ 2d 1438 (Fed. Cir. 1991).

CONCLUSION

The array substrate structure recited in independent claims 1 and 3, and their dependent claims, provides lower contact resistance, reduced signal propagation delay, and more even luminance across the resulting liquid crystal display, and is an innovation worthy of protection. The structure is not fairly suggested by any combination of DOHJO and SAKATA, and the rejections under section 102(b) and section 103 should therefore be reversed.

Our check # 27497 in the amount of $500 (FEE CODE 1402) for the necessary fee is submitted herewith; if any additional fee is required, please charge to our Deposit Account 23-0442.

Respectfully submitted,

Milton Oliver

Milton Oliver, Reg. # 28,333
WARE FRESSOLA VDS & ADOLPHSON
755 Main St., Bldg. 5
PO BOX 224
MONROE CT 06468-0224
TEL: 203-261-1234
FAX: 203-261-5676

(8) CLAIMS APPENDIX

1. An array substrate comprising:

a display area in which pixel electrodes are formed,

a scanning line formed of a low resistivity metal, said scanning line being arranged between the pixel electrodes,

a signal line formed of a high melting point metal selected from the group consisting of chrome, molybdenum, tantalum and alloys thereof, said signal line crossing over the scanning line interposing an insulating layer therebetween,

a terminal to which a scanning signal is applied, and

an extended scanning line for connecting the scanning line with the terminal, said extended scanning line being formed only of the same conductive film as for said signal line.

2. The array substrate of claim 1, comprising:

an auxiliary capacitance line arranged parallel to the scanning line,

a collected auxiliary capacitance line arranged in parallel to the signal line and electrically connected to the auxiliary capacitance line,

a terminal to which a common signal is applied, and

an extended auxiliary capacitance line for connecting the collected auxiliary capacitance line with the terminal for the common signal, said extended auxiliary capacitance line being formed only of the same conductive film as for said signal line.

3. An array substrate comprising:

a display area in which pixel electrodes are formed,

a scanning line formed of a low resistivity metal, said scanning line being arranged between the pixel electrodes,

an auxiliary capacitance line arranged in parallel to the scanning line,

a signal line formed of a high melting point metal selected from the group consisting of chrome, molybdenum, tantalum and alloys thereof, said signal line crossing over the scanning line and the auxiliary capacitance line interposing an insulating layer therebetween,

a collected auxiliary capacitance line arranged in parallel to the signal line and electrically connected to the auxiliary capacitance line,

a terminal to which a common signal is applied, and

an extended auxiliary capacitance line for connecting the collected auxiliary capacitance line with the terminal, said extended auxiliary capacitance line being formed only of the same conductive film as for said signal line.

4. (Cancelled)

5. The array substrate of claim 1, wherein

the extended scanning line is formed only of the same conductive film as for the pixel electrodes, instead of the same conductive film as for said signal line.

6. The array substrate of claim 1, wherein

the extended scanning line is connected to the scanning line at the neighborhood of the display area and electrically connected to the terminal for the scanning signal at the neighborhood of the terminal.

7. (Cancelled)

8. The array substrate of claim 2, wherein the extended auxiliary capacitance line is formed only of the same conductive film as for the pixel electrodes, instead of the same conductive film as for the signal line.

9. The array substrate of claim 8, wherein the extended auxiliary capacitance line is electrically connected to the collected auxiliary capacitance line at the neighborhood of the display area and electrically connected to the terminal for the common signal at the neighborhood of the terminal.

10. The array substrate of claim 2, wherein the auxiliary capacitance line, the collected auxiliary capacitance line and the scanning line are formed from the conductive film of same layer.

11. The array substrate of claim 2, wherein the collected auxiliary capacitance line and the extended scanning line are crossing interposing an insulating layer therebetween.

12. The array substrate of claim 1, wherein aluminum or aluminum alloy is used for material of the scanning line.

13. The array substrate of claim 1, wherein partly or wholly nitridated aluminum or partly or wholly nitridated aluminum alloy is used for material of the scanning line.

14. (Cancelled)

15. The array substrate of claim 1, wherein the scanning line and the extended scanning line are electrically connected via a conductive film of the same layer as that for the pixel electrode.

16. The array substrate of claim 2, wherein the collected auxiliary capacitance line and the extended auxiliary capacitance line are electrically connected via a conductive film of the same layer as that for the pixel electrode.

17. The array substrate of claim 1, wherein either of the scanning line or the extended scanning line is formed in a grid or ladder like shape at a region in which the scanning line and the extended scanning line are overlapped within a connecting portion between the scanning line and the extended scanning line.

18. The array substrate of claim 2, wherein either of the collected auxiliary capacitance line or the extended auxiliary capacitance line is formed in a grid or ladder like shape at a region in which the collected auxiliary capacitance line and the extended auxiliary capacitance line are overlapped within a connecting portion between the collected auxiliary capacitance line and the extended auxiliary capacitance line.

19. (Cancelled)

20. (Cancelled)

21. (Cancelled)